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Two new synonyms in species of *Pseudopyrochroa* (Coleoptera: Pyrochroidae: Pyrochroinae)

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Abstract. Examination of the type series of *Schizotus gibbifrons* Lewis 1887 and *Pyrochroa higoniae* Lewis 1895, together with examination of the historical Lewis collection of *Pseudopyrochroa japonica* (Heyden 1879), provide hints as to the conspecificity of these binomials. This evidence, together with concurrent collection events spanning more than 100 years and general anatomy suggests *Pseudopyrochroa japonica* (Heyden 1879) and *Pseudopyrochroa gibbifrons* (Lewis 1887) are conspecific. *Schizotus gibbifrons* Lewis is proposed as a **new junior synonym** of *Pyrochroa japonica* Heyden, where it joins the established synonym, *Pyrochroa higoniae* Lewis (1895). *Schizotus theresae* Pic 1911 is also proposed as a **new junior synonym** of *Pyrochroa basalis* Pic 1906, where it joins a long list of synonyms. Complete synonymies are presented for both species.

Key Words. *Pseudopyrochroa basalis* (Pic), *Pseudopyrochroa gibbifrons* (Lewis), *Pseudopyrochroa japonica* (Heyden), *Pseudopyrochroa theresae* (Pic), Pyrochroidae, Indonesia, Japan, new synonym

Introduction

While updating a species list of *Pseudopyrochroa* Pic (1906) two overlooked synonyms were discovered. Cases are presented for each of the two, along with updated, detailed species synonymies.

***Pseudopyrochroa japonica* (Heyden, 1879a)**

Pyrochroa japonica Heyden 1879a: 88; Heyden 1879b; Lewis 1887, 1895; Pic 1912c
Pseudopyrochroa japonica (Heyden); Blair 1914, 1928; Hayashi 1969; Kôno 1929, 1935; Nakane 1960; Nakane and Baba 1961; Osawa 1947; Pollock and Young 2008
Pyrochroa higoniae Lewis 1895: 432
Pseudopyrochroa higoniae (Lewis); Pollock and Young 2008
Pseudopyrochroa var. *higoniae* (Lewis), Blair 1914, 1928, Kôno 1929
Pseudopyrochroa f. *higoniae* (Lewis); Kôno 1935
Pseudopyrochroa ab. *higoniae* (Lewis); Nakane 1960
Schizotus gibbifrons Lewis 1887: 173, **new synonym**
Pseudopyrochroa gibbifrons (Lewis); Blair 1914, 1928; Kôno 1929, 1935; Nakane 1960; Pollock and Young 2008

Heyden's (1879a: 88) description of *Pyrochroa japonica* (now in *Pseudopyrochroa*) suggests he described the species on the basis of a single female from Kyoto, Japan on the island of Honshū: "Femina … Prope ab urbe Kioto Japoniae semel capta". He further noted (1879b: 354): "Kioto, semel capta. Ein nicht gut erhaltenes Ex. (♀) von Kioto." Within several years this fairly common species was said to be known from both males and females (e.g., Lewis 1887: 171): "Heyden knew only the female. I have a series of about thirty examples from Subashiri, Kiga, and other places lying under mount Fujisan, and also a few from Nikko."

The nine male and seven female specimens I examined at The Museum of Natural History, London (BMNH) from Miyanoshita, Subashiri, Oyama and Nikko are no doubt part of this historical series. Label dates and locality data correspond exactly with the annotated Lewis itinerary (e.g., Bates 1883). All specimens were collected April – June, 1880. The single female I examined from Ontake bears no date, but examining the Lewis itinerary, it most likely came from a two day interval in late July, 1881.

The considerably later date likely correlates with the much higher elevation at Ontake (reported in the itinerary as 10,000 feet); the 1880 collection locations were recorded at elevations ranging from 1390 to 2723 feet.

In the same paper, Lewis (1887: 173) described *Schizotus gibbifrons* (now in *Pseudopyrochroa*) from what he considered to represent both males and females: "The female is very like the male, except that the interocular space is simply convex and the antennae less pectinate." He also noted, "Five examples, found on Oyayama in Hiogo, May 1881." Higo was a historical Japanese province in the area presently known as the Kumamoto Prefecture on the island of Kyūshū.

I located eight "*gibbifrons* Lewis" specimens in the BMNH; contrary to what Lewis wrote, all are conspecific females. Three specimens bear identical "Oyay." as well as "Kumamoto, 23.IV – 26.IV 81" labels. Two of the three also bear "Type" labels. I consider these three to be part of the "five examples" Lewis alluded to in spite of the difference in date. The lead specimen, bearing a circular, printed "Type" label is presumably the female Nakane (1973) mistakenly referred to as the "type" (infer holotype). In the Lewis itinerary for 1881, a subheading notes: "Oyayama, near Kumamoto, 13 days." Because this interval spans the end of April and the first part of May, it would be easy to confuse or comingle the months. Two lines below this, the itinerary lists "Kumamoto (Goka temple), 42" [feet elevation]; the time interval was 23–26 April, consistent with the label data. A fourth female bears "Oyam." and "Nagasaki, 22.V – 3.VI. 81" labels. Per the itinerary, Lewis left Kumamoto on 21 May and began collecting at Nagasaki on 22 May, 1881. The immediate spatial and temporal proximity of this specimen leads me to conclude it is also a syntype, accounting for four of the five specimens Lewis indicated in the description. Three of the eight Lewis specimens bear no locality labels, but on the underside of each mounting card is written "Higo." While this generally agrees with the specified type locality, whether these specimens are syntypes must be doubted, if for no other reason than it would inflate the syntype series to seven specimens when five were specifically noted by Lewis. Interestingly, the eighth specimen in the "*gibbifrons* Lewis" holdings is labeled "Miyanoshita, 11.V. – 14.V.80." This female was taken at the exact locality as seven of the historical "Lewis" specimens of *P. japonica*, and within days of his *P. japonica* collections at nearby Subashiri.

Lewis (1895) described *Pyrochroa higoniae* from "three or four specimens" collected at "Oyayama and Yuyama." Although he did not specifically allude to the sex of the specimens, the species description was based largely on cranial modifications of the male. Presumably, all specimens were males and this agrees with the four males I found at the BMNH under this name. The first bears a "Type" label and the locality, "Higo" is written on the underside of the mounting card. The second specimen also bears a handwritten "Higo" location on the underside of the mounting card. The third male is labeled "Yuyam, 8–13." If the numbers correspond to a range of days, this is consistent with the itinerary, showing that Lewis was at Yuyama (3000 feet), 10–14 May 1881. A hint as to why Lewis listed the number of specimens as "three or four" can be found on the label attached to the fourth specimen in the *higoniae* series: "var ♂ ?"

It is curious, amidst considerable cranial apparatus diversity in males of Japanese *Pseudopyrochroa*, that neither Lewis nor other pyrochroid researchers such as Blair (1914, 1928), Pic (1912c), Kôno (1929, 1935), or Nakane (1960) questioned the apparent lack of modifications in what was taken to be the Lewis series of both males and females of *P. gibbifrons*. Perhaps, at least for Blair and Pic, part of the confusion stemmed from the misunderstanding of the generic concepts applied to *Schizotus*, *Pyrochroa*, and *Pseudopyrochroa* that prevailed at the time. In any case, as noted above, all specimens in the type series of *P. gibbifrons* are female. From this discovery, and comparison with collection events it is likely that *P. gibbifrons* is no more than the female of *P. japonica*.

Blair (1914) and Kôno (1929) relied on cranial color to distinguish between the two species. The head (*sensu* Blair) or "Strin" (= frons or frontoclypeal region, *sensu* Kôno) of *P. gibbifrons* was said to be black. The "lower part of the face" (*sensu* Blair) or "Kopf vorn" (= head in front, *sensu* Kôno) was described as yellow (Blair) or "gelb oder rot" (= yellow or red, *sensu* Kôno). Color of the head, pronotum and even the elytra can be quite variable in species of *Pseudopyrochroa* (e.g. Young 1996b, Young, 2001a). Even as Lewis (1895: 432) noted when describing *P. higoniae* and comparing it to *P. japonica*, "The colour of the thorax varies in both … sometimes the lateral margins are infuscate, sometimes the central area also, and in other specimens the thorax is wholly red."

On the basis of the evidence presented above, I propose *Schizotus gibbifrons* Lewis, 1887 as a **new junior synonym** of *Pyrochroa japonica* Heyden, 1879.

***Pseudopyrochroa basalis* (Pic, 1906)**

Pyrochroa basalis Pic 1906: 29; Young 1996a, 1996b
Schizonotus javanus Pic 1909 (*lapsus calami*); Young 1996a, 1996b
Schizotus javanus Pic 1909; Young 1996a, 1996b
Schizotus theresae Pic 1911; Young 1996a, **new synonym**
Schizotus dohertyi Pic 1912a; Young 1996a, 1996b
Pyrochroa maculata Pic 1912b; Young 1996a, 1996b
Pyrochroa inapicalis Pic 1912b; Young 1996a, 1996b
Pyrochroa (*Schizotus*) *dohertyi* Pic 1912c
Pyrochroa fruhstorferi Pic, 1912d; Young 1996a, 1996b
Pyrochroa apicipennis Blair 1912; Young 1996b
Pyrochroa fulvipennis Blair 1912; Young 1996b
Pyrochroa ruficollis Blair 1912; Young 1996b
Pyrochroa (*Schizotus*) *testaceipennis* Pic 1913; Young 1996a, 1996b
Pyrochroa (*Schizotus*) *sulcaticeps* Pic 1913; Young 1996a, 1996b
Pyrochroa (*Schizotus*) *javanus* var. *reductus* Pic 1913; Young 1996a, 1996b
Pseudopyrochroa basalis (Pic); Blair 1914, 1928; Young 1996a, 2001b
Pseudopyrochroa javana (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa javana var. *reducta* (Pic); Blair 1914, 1928
Pseudopyrochroa dohertyi (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa dohertyi var. *ruficollis* (Blair); Blair 1914
Pseudopyrochroa maculata (Pic); Blair 1914; Young 1996a
Pseudopyrochroa inapicalis (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa fruhstorferi (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa apicipennis (Blair); Blair 1914, 1928
Pseudopyrochroa fulvipennis (Blair); Blair 1914, 1928
Pseudopyrochroa testaceipennis (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa sulcaticeps (Pic); Blair 1914, 1928; Young 1996a
Pseudopyrochroa opacicollis Pic 1921; Young, 1996a, 1996b
Pseudopyrochroa inapicalis var. *maculata* (Pic); Blair 1928
Pseudopyrochroa atra Pic 1938; Young, 1996a, 1996b
Pseudopyrochroa latenigra Pic 1938; Young, 1996a, 1996b
Pseudopyrochroa multiimpressa Pic 1943; Young, 1996b
Pseudopyrochroa javana reducta (Pic); Young 1996a
Pseudopyrochroa theresae (Pic); Young 1996a

Young (1996a) discussed the status of Pic's material of *P. theresae*, and designated a lectotype and two paralectotypes. When he (Young 1996b) presented a case for an extensive synonymy relating to *P. basalis*, he inadvertently excluded *Schizotus theresae* (Pic 1911: 158) from the list. The same evidence presented in that paper pertains to *S. theresae*. Thus, I belatedly propose *Schizotus theresae* Pic, 1911 as a **new junior synonym** of *Pyrochroa basalis* Pic, 1906.

Materials and Methods

Material Examined. Label data are presented verbatim. Line breaks on labels are denoted by a double slash (//); all metadata (not written directly on the original labels) are presented in regular brackets ([]); when data are included on more than one label, this is noted with curved brackets ({}). Scientific names are uniformly presented in *italics*.

Four-letter entomological collection acronyms identify the locations of specimens examined; curators are identified in the acknowledgments. The author's personal collection (DYCC) also houses material as noted in the text, but it is not identified in the acknowledgments. Acronyms and collections pertinent to this study are as follows:

AACC	Albert Allen Collection of Coleoptera, Boise, ID, USA
BMNH	The Natural History Museum, London, England, United Kingdom
MNHN	Museum National d'Histoire Naturelle, Paris, France
TARI	Taiwan Agricultural Research Institute, Wufeng, Taiwan
ZSSM	Zoologische Staatsammlung, Munich, Germany

In the case of *P. basalis*, hundreds of specimens have been examined. In the interest of space, I have recorded only the data for specimens that fit the description of *P. theresae, auctorum*.

***Pseudopyrochroa japonica* (Heyden):**
5♂♂**, 2**♀♀, [Japan] Miyanoshita // 24.IV. – 3.V. [18]80; {2nd label} Japan. // G. Lewis. // 1910-320. (BMNH)

1♀, [Japan] Nikko // 3.VI. – 21.VI. [18]80; {2nd label} Japan. // G. Lewis. // 1910-320. (BMNH)

1♀, [Japan] Ontake; {2nd label} Japan. // G. Lewis. // 1910-320. (BMNH)

1♂**,** Japan .Lewis. // ? *japonica* [on mounting card with specimen]; {2nd label} Sharp Coll. // 1905-313. (BMNH)

4♂♂**, 2**♀♀, [Japan] Subashiri // 4.V. – 10.V. [18]80 (BMNH)

1♂**,** Japan. // G. Lewis. // 1910-320. (BMNH)

1♀, [Japan] Oyam[a] // 24.V. – 26.V. [18]80; {2nd label} Japan. // G. Lewis. // 1910-320. (BMNH)

1♀, [Japan] Oyama [underside of mounting card]; {2nd label} Japan. // G. Lewis. // B.M. 1926-369. (BMNH)

1♂**,** Japan. // J. E. A. Lewis. // B.M. 1927-466.; {2nd label} 403.; {3rd label} JAPAN // KYUSHU // MT. UNZEN // AT 2000 ft. // 22.V. [19]'27 // J. E. A. Lewis (BMNH)

1♀, [Japan] Oyay.[ama]; {2nd label} Type [printed, circular label]; {3rd label} *Schizotus* // *gibbifrons* // Lewis Type ♂; {4th label} Kumamoto. // 23.IV – 26. IV. [18]81.; {5th label} Japan// G. Lewis // 1910-320.; {6th label} SYNTYPE: // SCHIZOTUS // GIBBIFRONS // Lewis // *fide*: Daniel K. Young (BMNH)

1♀, [Japan] Oyay.[ama]; {2nd label} *Pyrochroa* // *gibbifrons* // Lewis Type ♂; {3rd label} Kumamoto. // 23.IV – 26. IV. [18]81. {4th label} Japan// G. Lewis // 1910-320.; {5th label} SYNTYPE: // SCHIZOTUS // GIBBIFRONS // Lewis // *fide*: Daniel K. Young (BMNH)

1♀, [Japan] Oyay.[ama]; {2nd label} Kumamoto. // 23.IV – 26. IV. [18]81. {3rd label} Japan// G. Lewis // 1910-320.; {4th label} SYNTYPE: // SCHIZOTUS // GIBBIFRONS // Lewis // *fide*: Daniel K. Young (BMNH)

1♀, [Japan] Oyam.[Yuyama?]// 1.6.[18]81; {2nd label} Nagasaki // 22.V – 3.VI. [18]81; {3rd label} Japan// G. Lewis // 1910-320.; {4th label} SYNTYPE: // SCHIZOTUS // GIBBIFRONS // Lewis // *fide*: Daniel K. Young (BMNH)

1♀, [Japan] Higo [underside of mounting card]; {2nd label} Japan// G. Lewis // 1910-320.; {3rd label} Probably NOT // a syntype // det. Daniel K. Young (BMNH)

1♀, [Japan] Higo [underside of mounting card]; {2nd label} Japan// G. Lewis // 1910-320.; {3rd label} Probably NOT // a syntype // det. Daniel K. Young (BMNH)

1♀, [Japan] Higo [underside of mounting card]; {2nd label} Japan// G. Lewis // 1910-320.; {3rd label} Probably NOT // a syntype // det. Daniel K. Young (BMNH)

1♀, [Japan] Miyan.[oshita]// (S.); {2nd label} Miyanoshita. // 11.V. – 14.V. [18]80; {3rd label} Japan// G. Lewis // 1910-320.; {4th label} NOT a // syntype // det. Daniel K. Young (BMNH)

1♂, [Japan] Higo [underside of mounting card]; {2nd label} Type [printed, circular label]; {3rd label} *Pyrochroa* // *higoniae* // Lewis Type ♂; {4th label} Japan// G. Lewis // 1910-320.; {5th label} SYNTYPE: // PYROCHROA // HIGONIAE ♂ // Lewis // Daniel K. Young (BMNH)

1♂, [Japan] Higo [underside of mounting card]; {2nd label} Japan// G. Lewis // 1910-320.; {3rd label} SYNTYPE: // PYROCHROA // HIGONIAE ♂ // Lewis // Daniel K. Young (BMNH)

1♂, [Japan] Yuyam[a] // 8-13; {2nd label} *Pyrochroa higoniae* Lewis; {3rd label} Japan// G. Lewis // 1910-320.; {3rd label} SYNTYPE: // PYROCHROA // HIGONIAE ♂ // Lewis // Daniel K. Young (BMNH)

1♂, [Japan] var ♂ ?; {2nd label} Japan// G. Lewis // 1910-320.; {3rd label} SYNTYPE: // PYROCHROA // HIGONIAE ♂ // Lewis // Daniel K. Young (BMNH)

1♂, **3**♀♀ [Japan] MUSEUM PARIS, JAPON, NIPPON MOYEN, ENV. TOKIO, J. HARMAND 1906 (MNHN)

4♀♀ [Japan] MUSEUM PARIS, JAPON, NIPPON MOYEN, ENV. DE TOKIO, E. GALLOIS 1906 (MNHN)

1♂, **1**♀ [Japan] MUSEUM PARIS, NIPPON MOYEN, ENV. TOKIO, ET ALPES DE NIKKO, J. HARMAND 1901 (MNHN)

4♀♀, [Japan] MUSEUM PARIS, JAPON, KIOU-SIOU (KIUSHIU), BASSIN SUPÉRIEUR, DE LA SENDAIGAWA, E. GALLOIS 1906 (MNHN)

1♀, [Japan] MUSEUM PARIS, JAPON, KIOU-SIOU (KIUSHIU), BASSIN SUPÉRIEUR, DE LA SENDAIGAWA, E. GALLOIS 1906; [label I added]: HOMEOTYPE, *Pseudopyrochroa, gibbifrons* (Lewis), Daniel K. Young (DYCC)

2♀♀, [Japan] Kumanotaïra, pr. Karuïzawa, Japon, 25,6,1911, Edme Gallois (MNHN)

1♀, [Japan] JAPON: Route, de Chûzenji à, Yumoto, 22-7-09, Edme Gallois (MNHN)

1♂, Japan. G. Lewis., 1910-320. (MNHN)

1♂, [Japan]: [Ehime: Japan], Mt. Saragamine, 12. V. 1985, M. Sakai leg. (AACC)

2♂♂, Japan, Ishigawa Pref. // Shiramine Mt. Hakosan // W slope 900-1200m // 7 Jun 2003, Bolm lgt. (DYCC)

1♀, Japan// Fuji – Gebiet// V. [19]70 [remainder looks like collector name – can't make out writing] (ZSSM)

1♀, [JAPAN] Mt. Kario:// Hirosimaken // (Japan) 4. VI. 1973 // Col. S. Miyamoto; [2nd label, folded – original data, hand written with Japanese (?) characters] (TARI)

1♂, [Japan]: Serio, // Kyoto // 22. V. 1951 // T. Nakane ; {2nd label} [1st line Japanese characters and distal portion of left antenna afixed] // Kyoto // 22.V.1951. (DYCC)

1♂, [Japan]: Komenono // Matsuyama // 23. V. 1965 // Y. Hori leg. (DYCC)

1♂, [Japan]: Mt. Akaboshi // Ehime Pref. // 5. V. 1966 // S. Hisamatsu (DYCC)

1♀, [Japan]: Omogo Valley // Ehime Pref. // May 25, 1959 // S. Hisamatsu (DYCC)

1♀, [Japan]: Mt. Tsurugi // Tokushima Pref. // Jun. 9, 1959 // S. Hisamatsu (DYCC)

1♂, [Japan]: KIBUNE // NEAR-KYOTO // 24. V 1962 // leg. Mitsuo Goto (DYCC)

1♀, [Japan]: KASUGA // 10-v- 1957 // COL. T. SHIBATA (DYCC)

1♀, [Japan]: Kyoto // 15 MAY 1955 // T. Nakane (DYCC)

1♀, [Japan]: Yunoyama // MIYE // 21-v-1944 // S. OSAWA (DYCC)

1♂, [Japan]: Serio, // Kyoto // 1. VI. 1953 (DYCC)

1♀, [Japan]: HASE // 3-V- 1958 // COL. T. SHIBATA (DYCC)

1♀, [Japan]: HONSHU // Mt. Ifuri // Fukui Pref.; {2nd label} 18.v.1969 // coll. H. Sasaji (DYCC)

1♂, [Japan]: Mennoki-tôge // Inabu-chô // Aichi Pref., JPN // 19. V. 1995 // H. Yoshitomi leg. (DYCC)

1♂, [Japan]: Uradani // Shitara-chô // Aichi Pref., JPN // 11. VI. 1995 // H. Yoshitomi leg. (DYCC)

1♀, [Japan]: Togakushi // Kamiminochi-gun // Nagano pref., JPN // 25. VI. 1993 // H. Yoshitomi leg. (DYCC)

1♂, **3**♀♀, [Japan]: Hirakura // Misugi-mura // Mie pref. // 23. V. 1993 // H. Yoshitomi leg. (DYCC)

1♀, [Japan]: Hirakura // Misugi-mura // Mie pref. // 23. V. 1993 // K. Fukuzumi leg (DYCC)

1♀, [Japan]: Menoki-tôge // Kitashitara-gun // Aichi pref. // 13. VI. 1992 // K. Ishida leg. (DYCC)

***Pseudopyrochroa basalis* (Pic):**
1♂**,** [Indonesia]: SUMATRA // SI-RAMBÉ // XII.[18]90 – III.[18]91 // E. MODIGLIANI; {2nd label} type [handwritten]; {3rd label} TYPE [red label]; {4th label} *Schizotus* // *theresae* Pic; {5th label} LECTOTYPE: ♂ // SCHIZOTUS // THERESAE // Pic // Daniel K. Young (MNHN)

1♂**,** [Indonesia]: SUMATRA // SI-RAMBÉ // XII.[18]90 – III.[18]91 // E. MODIGLIANI; {2nd label} 347; {3rd label} type [handwritten]; {4th label} PARALECTOTYPE: ♂ // SCHIZOTUS // THERESAE // Pic // Daniel K. Young (MNHN)

1♂**,** [Indonesia]: SUMATRA // SI-RAMBÉ // XII.[18]90 – III.[18]91 // E. MODIGLIANI; {2nd label} PARALECTOTYPE: ♂ // SCHIZOTUS // THERESAE // Pic // Daniel K. Young (MNHN)

1♂**,** [Indonesia]: M. B. Corporaal // Brastagi // 27.5.1918; {2nd label} NOT a // syntype // det. Daniel K. Young // 1991 (MNHN)

1♂, [Indonesia]: Corporaal // Brastagi // 14.5.1918; {2nd label} *theresae* Pic; {3rd label} NOT a // syntype // det. Daniel K. Young // 1991 (MNHN)

1♂, [Indonesia]: Corporaal // Brastagi // 5.1918; {2nd label} Sumatra // (Corporaal); {3rd label} NOT a // syntype // det. Daniel K. Young // 1991 (MNHN)

1♀, [Indonesia]: Sumatra // [? looks like] Tingalacy; {2nd label} NOT a // syntype // det. Daniel K. Young // 1991 (MNHN)

1♂, INDONESIA: West Java // Gede Pangrango N. P. // 3 June 1989 // Daniel K. Young; {2nd label} Along trail from // Guest House // to Cibeureum // Elev. 4400-6000′ (DYCC)

3♂♂, [Indonesia]: SUMATRA, Jambi // Kersik Tua, Gn. Kerinci // 19-22.Jan 2005 // 1600-2200m., Bolm lgt. (DYCC)

2♀♀, [Indonesia]: SUMATRA Gn Talamau // 17km E Simpangempat // 21-25 May 2001 750m // Bolm lgt., (Ophir mis) (DYCC)

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